Complexification (Dynamics of Holon Evolution): What do each of the following word pairs have in common?

- ▶ cell–organism
- ▶ planet–galaxy
- ▶ perception–concept
- ▶ individual–society
- ▶ computer–the Internet
- ▶ musician–band

These pairs represent just a few examples of holons—wholes that are also parts of more complex wholes, or whole/parts. Chapter 4, "Master Your Craft," includes a more in-depth discussion of this incredibly useful concept, as does Appendix B, "Integral Theory Primer."

To fully understand how our industry evolved to what it is today, we need a basic understanding of the process of complexification. Specifically, we are interested in the term complexification as it is used in systems theory. Systems theory is the transdisciplinary study of any self-regulating system, such as inquiries found in thermodynamics, meteorology, electronics, computing, biology, psychology, ecology, economics, sociology, and history. Systems theory emphasizes the significance of interrelationships and is often considered the first "holistic" modern field of science, dating back to Ludwig von Bertalanffy in the 1930s. We might consider systems theory as a scientific approach to understanding context. As you may recall from a few pages back, Merriam-Webster.com defines context as "the interrelated conditions in which something exists or occurs." We are not only interested in considering systems as they are, but also how they evolve. Complexification is used to describe a ubiquitous dynamic found in evolving systems. It describes how dynamics that commonly emerge as simpler systems become parts of more complex systems, including the implications for parts and the new whole. In other words, what happens to holons as they become parts of a more complex holon, and how is that emergent more complex holon different from all of its parts?

The parts are fundamental to the wholes, which have emergent abilities and capacities that the parts by themselves do not have. Yet, the new whole cannot exist without the parts. For example, the Internet can do a lot more than an individual computer. If you disconnect a few computers it doesn't matter, but if you disconnect all of them from the network, there is no more Internet. Although each individual computer loses the emergent functionality that exists only when connected to the network, individual computers can still continue to function as they did before gaining such additional capabilities. That is, unless a computer's basic functions were designed after the emergence of the Internet in such a way that they are dependent on a network connection, such as with the so-called "netbooks" like Google's Chromebook.

Complexification sheds a lot of light on how it is that we can now produce music at home and then access it most anywhere. The functional complexity of the many parts becomes simplified in the new whole. In plain English, as systems evolve into a new larger system, there is a simplification in overall system function. For example, while sitting in front of your home computer, you have most of the same basic functionality and capabilities that used to require a full recording studio system. While sitting in front of that same computer, you can buy music, which was produced in someone else's home while sitting at their computer, instead of having to leave your house and find transportation to a store. Talk about a simplification of system function! At the same time, the complexity of the software and hardware on which it runs, though physically smaller, is substantially higher, thanks to decades of technological advancement from numerous fields and industries. A recording engineer working in a studio in the 1980s could repair many equipment breakdowns himself, while not one of us knows how to fix the microprocessor in our computer that makes everything we do possible (although you might be able to replace it).

The common idiom "the whole is more than the sum of its parts" perfectly describes wholes and their emergent properties. But that is not the whole story. In *Method Vol. 1* (1992), leading systems theory philosopher Edgar Morin points out that not only is the whole more than the sum of its parts, but also that "the whole is less than the sum of the parts." According to Morin, this is due to the fact that some qualities, properties, abilities, or characteristics of the parts are suppressed, inhibited, or constrained by the systemic